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## EUROPEAN PATENT APPLICATION

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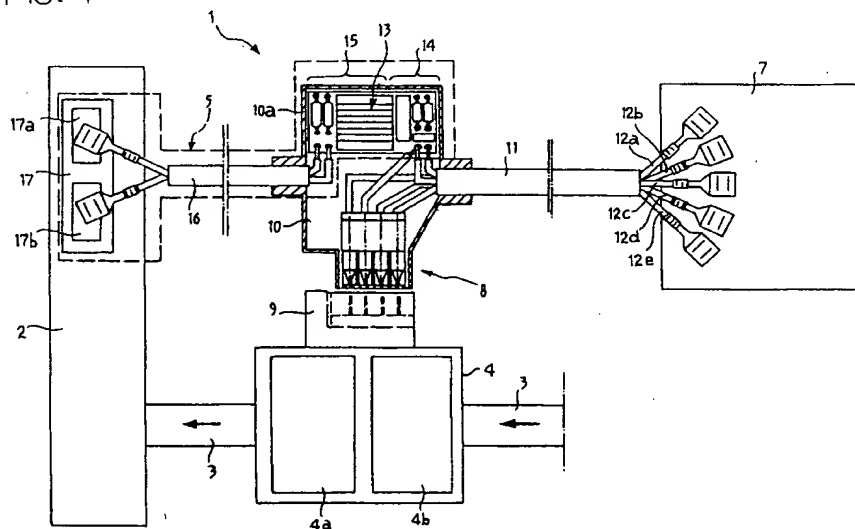
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### (54) A device for controlling a gas burner

(57) The device described for controlling a gas burner (2) comprises an electronic circuit unit (7) for controlling the burner (2) and functions associated therewith, an igniter unit (5) which is intended to generate a high-tension electrical discharge between electrodes associated with the burner and which includes at least one high-tension circuit portion (15), and at least

one solenoid valve (4a, 4b) which is intended to control the supply of gas to the burner (2) and is electrically connected to the control circuit unit (7) remotely by means of a connector (8) in which at least the high-tension circuit portion (15) of the igniter unit (5) is housed.

FIG. 1



## Description

The present invention relates to a device for controlling a gas burner according to the preamble to the main claim.

As is well known, devices of the type indicated are used for controlling the operation of burners such as, for example, those used in domestic heating appliances, in boilers, and the like. These devices permit remote electronic control and piloting of the burner functions, for example, of the ignition and flame-control operations, as well as cutting-off the gas-flow to the burner in the event of operating anomalies.

In a first known device, the circuit portion of the igniter unit which is arranged to generate the electrical discharge in order to ignite the flame is housed in the electronic control-circuit unit of the burner.

Although this solution has the advantage that it does not require any external electrical connection between the igniter unit and the control-circuit unit, it involves some disadvantages, amongst which is the fact that the electronic control circuit is subject to interference by radio emissions generated by the high voltage of the igniter unit, as well as to electromagnetic interference induced by the high-tension cable connecting the igniter unit and the electrode for igniting the burner. Moreover, since the electronic control circuit is normally in a position remote from the burner, the presence of fairly long high-tension connection cables accentuates the undesired effects of this interference.

In a second known device which can at least partially prevent the problems indicated above, the igniter unit is arranged outside the control circuit unit and is preferably mounted close to the burner. This solution reduces interference generated by the high voltage in the control circuit unit, but it requires a specific electrical connection between the circuit unit and the igniter unit.

The latter also has to have its own support and mechanical anchoring means, with consequent additional construction and assembly costs.

The problem upon which the present invention is based is that of providing a device for controlling gas burners which is designed structurally and functionally so as to overcome the problems complained of with reference to the prior art mentioned.

This problem is solved by the invention by means of a device for controlling gas burners formed in accordance with the following claims.

The characteristics and advantages of the invention will become clearer from the following description of a preferred embodiment thereof described by way of non-limiting example with reference to the appended drawings in which:

- Figure 1 is a schematic view of a control device for gas burners according to the present invention,
- Figure 2 shows a detail of the device of Figure 1 schematically in the form of a block diagram.

In Figure 1, a device according to the present invention for the remote control of the operation of a gas burner 2, is generally indicated 1.

The burner 2 is connected to a supply line 3 for a gaseous fuel, for example, methane gas.

The device 1 comprises a valve unit 4 including two solenoid valves 4a, 4b disposed in the gas supply line 3 to the burner 2, an igniter unit 5 arranged to transform a low-voltage signal into a pulsed high-voltage signal for generating a high-voltage electrical discharge in order to ignite the flame of the burner, and an electronic circuit unit 7 located in a position remote from the burner 2 and from the solenoid valves 4a, 4b and arranged for controlling and piloting the functions of the burner, particularly those provided for in the burner-ignition sequence and those for controlling the flame of the burner in operation.

The circuit unit 7 will not be described in detail since it is not the subject of the present invention.

Functionally similar electronic circuits are marketed by the Applicant. The circuit identified by the symbols "501 EFD", which also includes the circuit portion relating to the igniter unit, however, is mentioned by way of example.

The solenoid valves 4a, 4b are electrically connected to the circuit unit 7 by means of a connector 8 including first and second connector elements 9, 10 releasably associated with one another.

The first connector element 9 is mounted on the valve unit 4, and the second element 10 is electrically connected to an end of a connection cable 11. The opposite end of the cable 11 is electrically connected to the circuit unit 7.

The cable 11 comprises five electrical wires indicated 12a-e. The wires 12a, 12b are for the electrical connection between the circuit unit 7 and the solenoid valves 4a, 4b; the wire 12c is common to both solenoid valves. The wire 12d is for earthing the circuit, and the wire 12e is for connecting the circuit unit 7 to the igniter unit 5 for the electrical supply thereof.

The igniter unit 5 comprises a circuit 13 in which a low-tension circuit portion 14, that is, a portion affected by the supply voltage (for example, 220 volts) and a high-tension circuit portion 15, that is, a portion affected by a pulsed voltage of the order of a few Kvolts, which is necessary for generating the electrical discharge used to ignite the burner can be identified.

In accordance with a principal characteristic of the invention, the circuit portions 14, 15 of the igniter unit 5 are housed entirely in a casing 10a of the second element 10 of the connector 8. The low-tension circuit portion 14 is supplied electrically by means of the wires 12c, 12e whereas the high-tension circuit portion 15 is connected, outside the connector 8, by means of a cable 16, to a igniter element 17 associated with the burner 2 and, for example, including two electrodes 17a, 17b between which the electrical discharge which starts combustion takes place.

Alternatively, only the high-tension circuit portion 15 may be housed in the second element 10 of the connector 8 whilst the low-tension circuit portion 14 remains mounted on the circuit unit 7. It will be noted that, in both cases, the electrical wires 12d, 12e of the cable 11 are affected exclusively by the low-voltage supply of the device 1, for example, the voltage present in the domestic electrical mains.

Figure 2 shows the circuit 13 of the igniter unit 5 schematically in the form of a block diagram. The low-tension circuit portion 14 comprises a filter 18 for preventing the passage of currents having frequencies greater than a predetermined cut-off frequency. The filter 18 is interposed electrically between the electrical supply mains R and an electrical charge storage device, for example, a capacitor 19 of an R/C circuit.

The capacitor 19 is connected electrically by means of a switch or trigger 20, to the primary circuit of a voltage step-up device or transformer 21. When the electrical charge stored in the R/C circuit exceeds a threshold value, the trigger 20 is opened so as to allow current to pass to the transformer 21 which raises its voltage.

Electrical resistances 22 are provided downstream of the secondary circuit of the transformer 21 as elements for damping electrical discharges generated by the circuit 13.

These resistances 22 are connected by means of the high-tension cable 16 to the igniter element 17 associated with the burner 2.

The invention thus solves the problem set, achieving many advantages over known solutions.

As can be appreciated from the description, one of the advantages of the device according to the present invention lies in the fact that, owing to the removal of the high-tension circuit portion of the ignition unit from the electronic control circuit, the latter is not subject to interference by radio emissions or to electromagnetic interference induced by the high voltage.

Moreover, the housing of the whole of the circuit portion of the igniter unit in the connector does not require any additional connection cables between the igniter unit and the control circuit unit apart from those normally provided.

A further advantage lies in the fact that, since the entire circuit portion of the igniter unit is housed in the connector, no support or mechanical anchorage is required for it.

Moreover, since the valve unit with which the connector is associated is normally arranged close to the burner, there is the advantage that fairly short cables are used for the connection between the high-tension circuit portion and the electrode igniter element of the burner, thus considerably limiting the above-mentioned undesired effects of the high voltage.

- an electronic control circuit unit (7) for controlling the burner (2) and functions associated therewith,

- a igniter unit (5) which is intended to generate a high-voltage electrical discharge between electrodes associated with the burner (2) and which includes at least one high-tension circuit portion (15),

- at least one solenoid valve (4a, 4b) for controlling the gas supply to the burner, the solenoid valve (4a, 4b) being electrically connected to the control circuit unit (7) remotely by means of a connector (8) having first and second connector elements (9, 10) associated with one another releasably, the first connector element (9) being mounted on the solenoid valve and the second connector element (10) being associated with an electrical wire (11) for connection to the control circuit unit (7), characterized in that at least the high-tension circuit portion (15) of the igniter unit (5) is housed in the connector (8).

2. A device according to Claim 1, in which the high-tension circuit portion (15) of the igniter unit is mounted in the second connector element (10).
3. A device according to Claim 1 or Claim 2, in which the entire igniter unit (5) is mounted in the second connector element (10).
4. A device according to one or more of the preceding claims, in which the second connector element (10) comprises a casing (10a), the high-tension circuit portion (15) and/or the igniter unit (5) being housed in the casing (10a).
5. A device according to one or more of the preceding claims, in which the igniter unit (5) comprises a circuit (13) including means (19) for storing an electrical charge and a switch device (20) for supplying the charge discontinuously to a voltage step-up device (21) during the discharge of the storage means (19).

## Claims

1. A device for controlling a gas burner 2, comprising:

FIG. 1

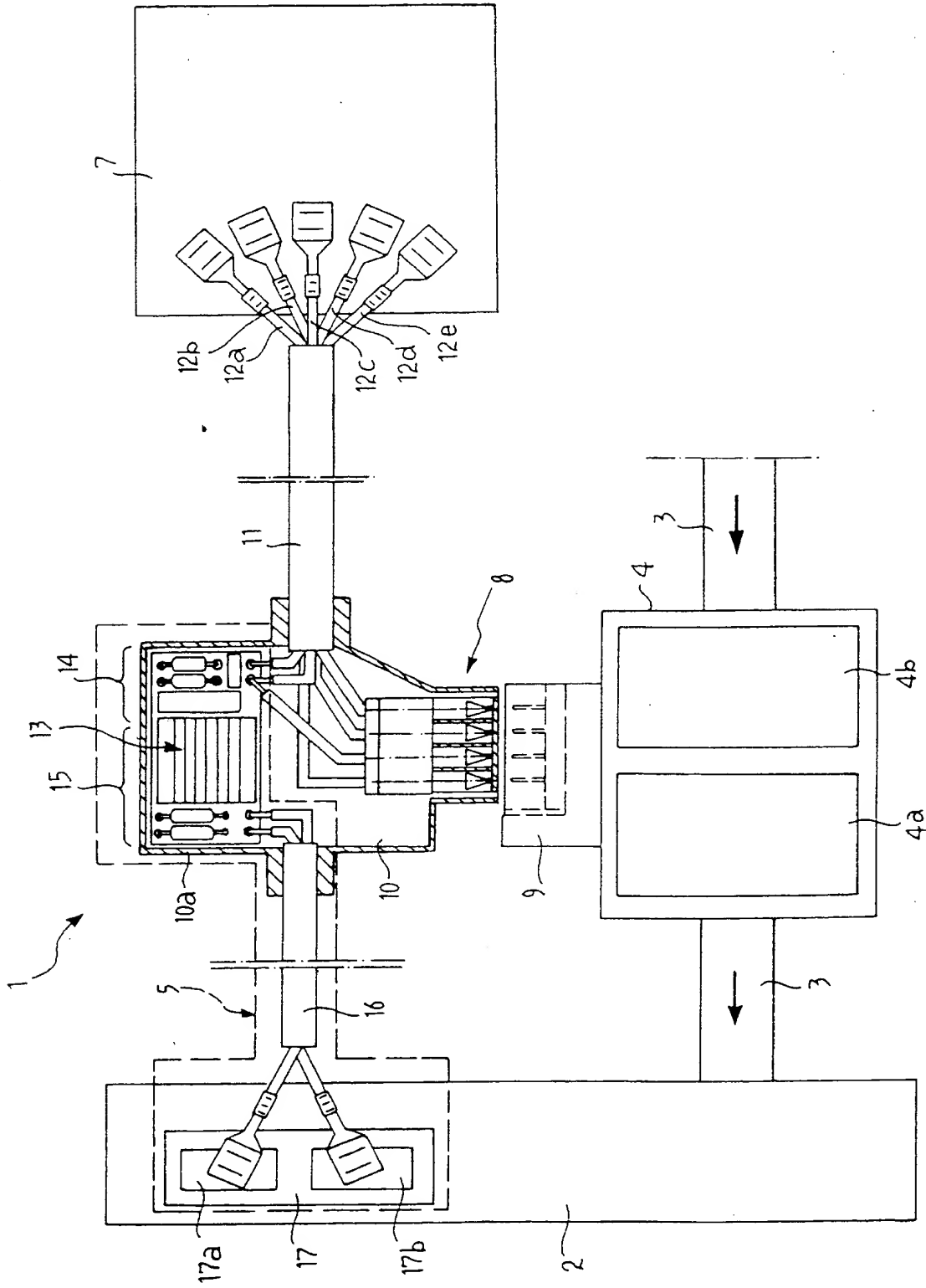
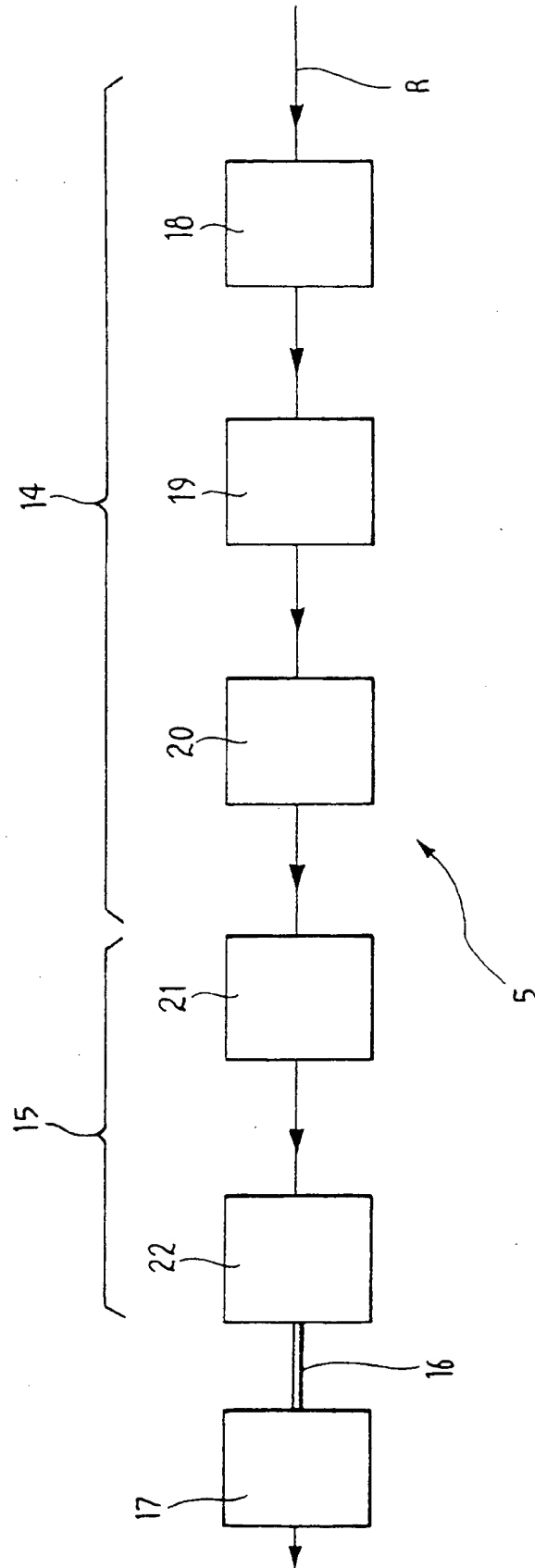


FIG. 2





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# EUROPEAN SEARCH REPORT

Application Number  
EP 96 20 3715

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 43 00 309 A (STEUERUNGSTECHNIK STAIGER) * the whole document *	1-5	F23N5/26 F23Q3/00
A	US 4 412 269 A (STELLA ET AL.) * abstract; figures *	1	
A	GB 1 394 719 A (SOCIETE DE BOURGUIGNONNE DE MECANIQUE) * figures *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F23N F23Q
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 September 1997	Examiner Kooijman, F
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